

CLAIMS

1. A processor-readable medium comprising processor-executable instructions for:

locating at least two zones within a document;

5 recognizing content types within the at least two zones, wherein the content types comprise: text and lines; graphic images; photographic images; and background;

applying a rendering intent to each of the at least two zones based on the content type within the zone; and

10 merging the at least two zones into an image.

2. A processor-readable medium as recited in claim 1, comprising further instructions for:

obtaining the document by operation of a scanner, a camera or an
15 application.

3. A processor-readable medium as recited in claim 1, wherein applying the rendering intent comprises further instructions for:

evaluating bit-depth and resolution within a zone to determine
20 appropriate rendering intent.

4. A processor-readable medium as recited in claim 3, wherein the merging comprises further instructions for:

merging a zone that was processed by a perceptual rendering intent with
25 a zone which was processed by a saturation rendering intent.

5. A processor-readable medium as recited in claim 1, comprising further instructions for:

recognizing memory color objects within a photographic image.

5 6. A processor-readable medium as recited in claim 1, comprising further instructions for:

recognizing memory color objects, within a photographic image within a zone, using input comprising: geometric shape; object color; relative placement of memory color objects; and use or non-use of flash in captured images.

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7. A processor-readable medium as recited in claim 1, comprising further instructions for:

wherein the photographic images comprise a memory color object, processing the memory color object differently than other areas of the photographic image.

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8. A processor-readable medium as recited in claim 1, comprising further instructions for:

recognizing when a photographic image comprises a memory color object;

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applying different weights to pixels within areas inside the memory color object, near the memory color object, and remote from the memory color object; and

color mapping pixels according to a weight applied.

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9. A processor-readable medium as recited in claim 1, comprising further instructions for:

applying graduations of a perceptual rendering intent to areas within, near, and removed from, a memory color object within a zone.

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10. A processor-readable medium as recited in claim 1, comprising further instructions for:

recognizing a memory color object in a photographic image;

more aggressively moving pixel color of pixels within the memory color

10 object; and

less aggressively moving pixel color of pixels not within the memory color object.

11. A processor-readable medium as recited in claim 10, comprising further instructions for:

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segmenting photographic images, to result in segments with a memory color object and segments without a memory color object; and

processing the segments differently.

12. A processor-readable medium as recited in claim 1, comprising further instructions for:

recognizing a memory color object within at least one of the at least two zones by considering a geometric shape and location of the memory color object;

comparing color within the memory color object to optimal memory colors; and

where a difference in the comparison is less than a threshold value, color mapping at least some pixels contained within the memory color object at least part of the way to the optimal memory colors.

13. A processor-readable medium as recited in claim 1, comprising further instructions for:

where at least one of the at least two zones has photographic content, recognizing memory color objects within the photographic content;

determining if coloring of the memory content object is within a threshold of expectations; and

mapping a group of pixels comprising the memory color object, wherein the mapping moves at least some of the group of pixels at least part of the way to the expectations.

14. A processor-readable medium as recited in claim 1, comprising further instructions for:

recognizing at least one memory color object;

determining if a color difference between the at least one object is
5 greater than a threshold; and

where the threshold has not been exceeded, applying a color transformation to the at least one memory color object.

15. A processor-readable medium comprising processor-executable
10 instructions for:

obtaining an image;

analyzing the image to determine zones, wherein the zones are distinguished by their bit-depth; and

applying a color transform appropriate to the characteristics of the zone.

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16. A processor-readable medium as recited in claim 15, wherein applying the color transform comprises further instructions for:

processing a zone comprising graphics differently than a zone comprising a photographic image.

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17. A processor-readable medium as recited in claim 15, additionally comprising:

segmenting memory color objects within a zone comprising a photographic image; and

25 processing the memory color objects differently than other areas of the photographic image within which the memory color object is located.

18. A processor-readable medium as recited in claim 15, wherein segmenting memory color objects comprises further instructions for:

employing memory color object recognition algorithms to detect memory color objects.

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19. A processor-readable medium as recited in claim 18, wherein employing memory color object recognition algorithms comprises further instructions for:

recognizing memory color objects by shape, by color and by location
10 within the image.

20. A processor-readable medium as recited in claim 19, comprising further instructions for:

recognizing memory color objects in part by whether flash was used in
15 capturing the image.

21. A processor-readable medium as recited in claim 15, wherein the applying the perceptual color transformation comprises further instructions for:

approximating coloring of the memory color objects to a known optimal
20 point.

22. A processor-readable medium as recited in claim 15, wherein applying a perceptual color transformation comprises further instructions for:

selecting pixels within a memory color object for color adjustment; and
25 adjusting coloring of the selected pixels by a percentage of a distance separating an initial pixel color and a known optimal color.

23. A processor-readable medium as recited in claim 15, wherein applying a perceptual color transformation comprises further instructions for:

more aggressively moving pixel color of pixels within a memory color object; and

5 less aggressively moving pixel color of pixels not within a memory color object.

24. A color image processor, comprising:

a zoning analyzer to find at least two types of zones within a document
10 by distinguishing a measure of each zone's bit-depth;

a color mapping algorithm to apply a rendering intent to each of the at least two types of zones based on type of content within the zone; and

an image manager to merge the at least two types of zones into a single image for output.

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25. The color image processor as recited in claim 24, additionally comprising:

a memory object segmenter, to segment memory color objects within color photographs found in a zone found by the zoning analyzer.

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26. The color image processor as recited in claim 25, additionally comprising:

a color weighing module to decide color weights for each pixel in segmented memory color objects; and

25 a color transform module to move each pixel according to its weight.

27. The color image processor as recited in claim 24, additionally comprising:

a memory color object segmenter to recognize a memory color object, to compare color within the memory color object to optimal memory colors, and, where a difference in the comparison is less than a threshold value, to color map at least some pixels contained within the memory color object at least part of the way to the optimal memory colors.

28. The color image processor as recited in claim 24, additionally comprising a memory color object segmenter, configured to:

where a zone has photographic content, recognize a memory color object within the photographic content within the zone using geometric shape data;

determine if coloring of the memory color object is within a threshold of memory color expectations; and, if not, to

map a subset of a group of pixels comprising the memory color object, wherein the mapping moves at least some of the group of pixels at least part of the way to the memory color expectations.

29. The color image processor as recited in claim 24, additionally comprising:

a memory color object segmenter, configured to recognize a memory color object by geometric configuration and to apply a color transformation to the memory color object, wherein the color transformation moves a percentage of a group of pixels within a geometric shape defined by the memory color object a percentage of a distance from an initial color to an expected color.

30. A color image processor, comprising:
means for obtaining an image;
means for analyzing zones within the image, and to thereby discover a
photo image;
- 5 means for segmenting memory color objects within the photo image;
means for mapping coloring of a percentage of pixels within a memory
color object, wherein the mapping moves the coloring a percentage of a
distance separating an initial pixel color and a known optimal distance.
- 10 31. The color image processor of claim 30, additionally comprising:
means for finding text and lines;
means for finding foreground graphics; and
means for finding a background.
- 15 32. The color image processor of claim 30, wherein the means for
segmenting memory color objects additionally comprises:
means for recognizing memory color objects by shape, by color and by
location within the image.
- 20 33. The color image processor of claim 30, additionally comprising:
means for using presence or absence of flash in recognizing memory
color objects.

34. The color image processor of claim 30, wherein the means for mapping coloring additionally comprises:

means for more aggressively moving pixel color of pixels within a memory color object; and

5 means for less aggressively moving pixel color of pixels not within a memory color object.

35. A method of color image processing, comprising:

obtaining an image;

10 demarking zones within the image, including: text; foreground graphics; foreground photographic images; and background;

segmenting the foreground photographic image according to regions of memory color object and non-memory color objects;

15 moving pixel color more aggressively toward an optimum color point, wherein the pixel is within the memory color object; and

moving pixel color less aggressively, wherein the pixel is not within the memory color object.

36. The method as recited in claim 35, additionally comprising:

20 a rendering intent is applied in a graduated manner within, near-by and apart from the memory color object.

37. The method as recited in claim 35, wherein obtaining the image comprises creating the image in an authoring program, scanning the image or
25 capturing the image with a camera.

38. The method as recited in claim 35, wherein demarking zones within the image comprises:

distinguishing zones based on bit-depth and pixel density.

5 39. The method as recited in claim 35, wherein segmenting memory color objects comprises:

recognizing memory color objects by shape, by color, by location within the image and by whether or not flash was used in obtaining the image.

10 40. The method as recited in claim 35, wherein moving pixel color more aggressively toward an optimum color point comprises:

rendering each zone based on content type within the zone.

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